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A SYSTEMATIC COMPARATIVE QUALITY ASSESSMENT AND STANDARDIZATION OF DASHAN SANSKAR CHURNA: AN AYURVEDIC FORMULATION

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ABSTRACT

Dashan Sanskar Churna is one of the widely prescribed churna stated in AFI, used in dental problems which are achieved by the abrasive effect of Khatika, whereas the other ingredients concurrently exhibit their particular therapeutic and effects e.g. destruction of bad breath by aromatic ingredients and decolorizing activity by Supari Bhasma. The objective of the study was to put up analytical parameters, along with development of finger printing of Dashan Sanskar Churna and to compare analytical data with that of market samples available. A detailed comparative study of laboratory sample with two market samples has been done conform the same physicochemical parameters along with HPTLC pattern for Quality review and Standardization. Qualitative tests showed the presence of tannins, alkaloids, saponins, glycosides, triterpenoids and calcium. All three samples showed significantly less variations in physicochemical parameters. Colour and percentage of volatile oil was marginally low in the MS-II reflecting the quality of raw materials used. The total tannin in the laboratory prepared sample is 5.60% w/w whereas the findings in market samples were almost half of it i.e. 3% w/w MS-I and 2.64% w/w MS-II. Quantitative estimation of calcium was significantly less as in laboratory sample it was 45% w/w, in MS - I, 41% w/w and in MS - II sample II 43.3% w/w. It can be concluded in case of HPTLC of volatile oil of MS-II no characteristic spots were observed, this may be due to the use of sub-standard quality raw drugs.

Keywords: Dashan Sanskar Churna, Physico-chemical parameters, HPTLC, Standardization

INTRODUCTION

Present era is synonymous to "Era of technology and information". Keeping in view today's lifestyle everybody expects a miracle therapy which comes at the cost of affecting the other part of body and thus vicious circle is started, curing one thing and affecting the other. Standardization of Ayurvedic formulations is an important aspect of research in Indian system of medicine and essential for worldwide acceptance and globalization of Ayurveda. So, there is need of method development to ascertain standards for quality and purity of raw drugs as well as formulations to maintain their therapeutic efficacy.^{1,2}

Dashan Sanskar Churna is one of the widely prescribed Churna mentioned in Ayurvedic formulary of India and is used in problems related to tooth and gums. In case of Dashan Sanskar Churna contents are Shunthi, Haritaki, Musta, Kattha, Karpur, Supari Bhasm, Marich, Lavang, Twak and Khatika. Here, the formulation's half part is Khatika alone and the rest half contains other nine ingredients. So the main activity of the formulation i.e. dental care is achieved by the abrasive effect of Khatika, whereas the other ingredients simultaneously exhibits their particular therapeutic and allying effects e.g. destruction of bad breath by aromatic ingredients and decolorizing activity by supari bhasma. Hence in the present study a comparative pharmaceutical-analytical study of Dashan Sanskara prepared classically, and 2

market samples is attempted with current Quality control and assurance methodologies³⁻⁵.

Aims and Objectives

- To develop parameters for analysis of 'Dashan Sanskar Churna' to ensure it's in process and finished product quality
- To develop finger printing (HPTLC) of Dashan Sanskar Churna.
- To compare analytical data with that of market samples.

MATERIAL AND METHODS

The current work is i.e. "A Systematic Comparative Quality Assessment and Standardization of Dashan Sanskar Churna - An Ayurvedic Formulation" was planned in the following stages Viz

- Preparation and procurement of Dashan Sanskar Churna.
- Finished product standardization with comparative study to market sample.

1. Preparation and Procurement of Dashan Sanskar Churna

As per the plan of study the next step is to prepare the laboratory sample of Dashan Sanskar Churna by using the authenticated raw material, reduced to powder form and passed through 80# sieve. And also, procurement of two market samples is done in order to

fulfill the criteria of comparative study. Two market samples were named MS-I and MS-II. Therefore, the sample prepared in laboratory is used as standard Dashan Sanskar Churna and for comparison two market samples were also procured. The composition of Dashan Sanskar Churna as per "Ayurvedic formulary of India" Part-II has been presented in Table 1⁶.

Procedure

The required quantity of powdered raw drugs is taken in accurate ratio and mixed homogenously. The so obtained formulation is used as standard Dashan Sanskar Churna and labelled as in-house sample.

2. Finished Product Standardization

The main aim of the study is to get some guidelines for standardization of Dashan-Sanskar Churna by setting some standards. For this purpose, the in-house sample was analyzed thoroughly and the obtained results were compared with the analytical results of market samples. So, the results deduced with the in-house sample were considered as standard and the standardization pattern is developed. All the samples were analyzed by implementing various pharmacognostic, physicochemical parameters, chromatographic as well as other instrumental techniques⁷.

Table 1: Dashan Sanskar Churna - Ingredients

S. No.	Name of Ingredient	Latin name and Family	Part Used	Quantity Given	Quantity Taken
1.	Shunthi	<i>Zingiber officinale</i> (Zingiberaceae)	Rhizome	1 Part	13.88 G
2.	Haritaki	<i>Terminalia chebula</i> (Combretaceae)	Fruit Pulp	1 Part	13.88 G
3	Musta	<i>Cyperus rotundus</i> (Cyperaceae)	Rhizome	1 Part	13.88 G
4	Khadir (Kattha)	<i>Uncaria gambir</i> (Rubiaceae)	Leaves and Shoots Aqueous Extract	1 Part	13.88 G
5	Karpur	<i>Cinnamomum camphora</i> (Lauraceae)	Exudate	1 Part	13.88 G
6	Supari Bhasma	<i>Areca catechu</i> (Palmae)	Ash obtained from Carbonisation of Seed.	1 Part	13.88 G
7	Marich	<i>Piper nigrum</i> (Piperaceae)	Fruit	1 Part	13.88 G
8	Lavanga	<i>Syzygium aromaticum</i> (Myrtaceae)	Flower Bud	1 Part	13.88 G
9	Twak	<i>Cinnamomum zeylanicum</i> (Lauraceae)	Bark	1 Part	13.88 G
10	Khatika			9 Part	125 G

Table 2: Organoleptic Characters

	Sample		
	In House	Ms-I	Ms-II
Colour	Greyish Brown	Light Brown	Light Brown
Odour	Characteristic Aromatic	Characteristic Aromatic	Characteristic Aromatic
Taste	Astringent and Pungent	Astringent and Pungent	Astringent and Pungent
Texture	Smooth	Smooth	Smooth

Table 3: Analytical Values for Physico Chemical Parameters for Dashan Sanskar Churna

Parameters	Sample		
	In-House	Ms-I	Ms-II
Particle Size Getting Through 60# (% W/W)	97.8	98.6	93.3
Particle Size Passing Through 85# (% W/W)	89.7	90.6	84.5
Loss On Drying at 105°C (% W/W)	9.52	7.1	9.57
Ash Value (% W/W)	51.14	53.7	55.8
Acid Insoluble Ash (% W/W)	7.75	6.1	6.4
Water Soluble Ash (% W/W)	1.7	1.1	1.4
Water Soluble Extractive (% W/W)	8.84	10.80	8.83
Alcohol Soluble Extractive (% W/W)	12.5	12.42	8.82
Ph Value	6.81	6.26	6.80
Volatile Oil Content (% V/W)	1.2	1	0.4
Colour of Volatile Oil	Transparent	Transparent	Dull Yellow Coloured

Table 4: Qualitative Tests of Dashan Sanskar Churna

Test	Sample		
	In House	Ms-I	Ms-II
For Glycosides	+	+	+
For Alkaloids	+	+	+
For Tannins	+	+	+
For Tri Terpenoids	+	+	+
For Saponins	+	+	+

Table 5: Calcium Content of Dashan Sanskar Churna

Sample	Calcium Content % W/W
In House	45
Ms-I	41
Ms-II	43.4

Table 6: Total Tannin Content

Sample	Total Tannin Content (% W/W)
In House	5.60
Ms-I	3
Ms-Ii	2.64

Table 7: HPTLC-Under Short UV (254 Nm)

S. No.	Name of Sample	Rf.
1	Kattha	0.26, 0.38, 0.45, 0.62, 0.69, 0.73
2	Catechin	0.45
3	Haritaki	0.06, 0.12, 0.17, 0.22, 0.42, 0.45, 0.52, 0.59, 0.65, 0.73, 0.81
4	Ellagic Acid	0.46
5	Gallic Acid	0.53
6	In House	0.12, 0.42, 0.47, 0.53, 0.63, 0.67, 0.77, 0.90
7	Ms-I	0.12, 0.42, 0.47, 0.53, 0.63, 0.67, 0.77, 0.99
8	Ms-Ii	0.12, 0.42, 0.47, 0.53, 0.63, 0.67, 0.77, 0.90
9	Marich	0.72, 0.80, 0.9
10	Piperine	0.80

(Chromatogram of Methanolic Extract of Samples Developed By Using Mobile Phase - Toluene: Ethylacetate: Formic Acid: Methanol)

Table 8: HPTLC Observation under Short UV (254 Nm)

S. No.	Name of Sample	Rf.
1	Kattha	0.16, 0.45, 0.68
2	Catechin	0.45
3	Haritaki	0.05, 0.51, 0.61, 0.76, 0.41,
4	Ellagic Acid	0.41
5	Gallic Acid	0.51
6	In House	0.41, 0.45, 0.51, 0.72, 0.85
7	Ms-I	0.41, 0.45, 0.51, 0.72, 0.85
8	Ms-Ii	0.40, 0.45, 0.51, 0.72, 0.85

(Chromatogram Developed To Check out the Presence of Tannin Constituents in the Formulation)

Table 9: HPTLC-Observation under Short UV (254 Nm)

S. No.	Name of Sample	Rf.
1	In House Sample	0.79
2	Ms-I	0.79
3	Ms-Ii	0.79
4	Piperine	0.79 (Piperine)
5	Marich	0.79, 0.83

(To Detect the Presence of Marich in the Formulation)

Table 10: after Derivatizing with Dragendroff's Reagent

S. No.	Name of Sample	Rf.
1	In House Sample	0.79, 0.90
2	Ms-I	0.78, 0.89, 0.19
3	Ms-Ii	0.79, 0.88
4	Piperine	0.79
5	Marich	0.72, 0.79

Table 11: HPTLC-Observation under Short UV (254 Nm)

S. No.	Name of Sample	Rf.
1	Lavanga	0.10, 0.62, 0.67, 0.98
2	Eugenol	-
3	Shunthi	0.35, 0.38, 0.98
4	Shagoal	0.35
5	In House Sample	0.09, 0.16, 0.20, 0.46, 0.61
6	Ms-I	0.10, 0.15, 0.19, 0.6
7	Ms-Ii	0.09, 0.15, 0.20
8	Twak	-
9	Musta	0.17, 0.30, 0.40, 0.51

(Chromatogram of methanolicextract of Samples along with Detection of Individual Ingredients)

Table 12: HPTLC-Observations under Long UV (366 Nm)

S. No.	Name of Sample	Rf.
1	Lavanga	0.08, 0.20, 0.29, 0.37
2	Eugenol	-
3	Shunthi	0.8, 0.29, 0.34, 0.39
4	Shagoal	-
5	In House Sample	0.08, 0.14, 0.18, 0.24, 0.30, 0.48
6	Ms-I	0.08, 0.14, 0.18, 0.24, 0.48
7	Ms-Ii	0.08, 0.14, 0.20, 0.18, 0.24, 0.30, 0.34, 0.48
8	Twak	0.23, 0.36, 0.49
9	Musta	0.31, 0.07, 0.38

Table 13: Observations after derivatizing with Anisaldehydesulphuric acid reagent

S. No.	Name of Sample	Rf.
1	Lavanga	0.11, 0.16, 0.25, 0.35, 0.55, 0.91,
2	Eugenol	0.53
3	Shunthi	0.09, 0.23, 0.35, 0.38, 0.9
4	Shagoal	0.35
5	In House Sample	0.08, 0.14, 0.18, 0.24, 0.29, 0.35, 0.53, 0.6, 0.9, 0.91
6	Ms-I	0.09, 0.14, 0.24, 0.29, 0.35, 0.53, 0.88, 0.92
7	Ms-Ii	0.08, 0.13, 0.23, 0.28, 0.35, 0.53, 0.88, 0.93
8	Twak	0.11, 0.23, 0.92
9	Musta	0.12, 0.17, 0.23, 0.29, 0.36, 0.47, 0.56, 0.89

Table 14: HPTLC-under Short UV (254 Nm)

S. No.	Name of Sample	Rf.
1	Lavanga	0.53, 0.77, 0.87
2	Eugenol	0.53
3	Shunthi	0.37, 0.47, 0.51, 0.54, 0.69, 0.97
4	Shagoal	0.37
5	In House	0.42, 0.52, 0.60, 0.72, 0.99
6	Ms-I	0.42, 0.52, 0.60, 0.96
7	Ms-Ii	-
8	Twak	0.56
9	Marich	0.17, 0.31, 0.36, 0.67, 0.86, 0.99
10	Musta	0.36, 0.42, 0.51, 0.63, 0.69, 0.97

(Chromatogram of Volatile oils of the formulation along with simultaneous detection of individual drug volatile oil in the sample)

Table 15: After Derivatized with AnisaldehydeSulphuric Acid

S. No.	Name of Sample	Rf.
1	Lavanga	0.16, 0.36, 0.53, 0.88
2	Eugenol	0.53
3	Shunthi	0.04, 0.15, 0.23, 0.27, 0.37, 0.43, 0.49, 0.57, 0.69, 0.94
4	Shagoal	0.38
5	In House	0.30, 0.35, 0.39, 0.48, 0.53, 0.66, 0.94
6	Ms-I	0.24, 0.27, 0.32, 0.38, 0.39, 0.42, 0.48, 0.52, 0.69, 0.77, 0.94
7	Ms-Ii	-
8	Twak	-
9	Marich	0.29, 0.38, 0.57, 0.96
10	Musta	0.18, 0.27, 0.33, 0.39, 0.51, 0.58, 0.62, 0.67, 0.71, 0.86, 0.96

Table 16: HPTLC-under Short UV (254 Nm)

S. No.	Name of Sample	Rf.
1	Camphor	0.70
2	In House	0.07, 0.20, 0.28, 0.36, 0.63, 0.71, 0.84, 0.96
3	Ms-I	0.07, 0.21, 0.27, 0.32, 0.70, 0.95
4	Ms-Ii	0.07, 0.22, 0.30, 0.35, 0.95

(Chromatogram of Methanolic Extracts of Sample, Along with the Simultaneous Detection of Camphor in the Formulation)

Fig. 1 (Plate - 1)

Figure 1 (Plate - 1): The chromatogram of methanolic extract of samples developed by using mobile phase Toluene: Ethylacetate: Formic acid: Methanol (6:6:1.8:0.35)

Fig. 2 (Plate - 2)

Figure 2 (Plate - 2): The chromatogram developed to check out the presence of tannin constituents in the formulation, along with individual tannin containing ingredients and by using different reference standards

Fig. 3 (Plate - 3)

Figure 3 (Plate - 3): This plate is specially designed to detect the presence of Marich in the formulation.

Fig.4 (Plate - 4)

Figure 4 (Plate - 4): The chromatogram of Methanolic extract of samples along with detection of individual ingredients (i.e. lavang, shunthi, twak and musta) in the formulation

Fig. 5 (Plate - 5)

Figure 5: The chromatogram of methanolic extracts of sample, along with the simultaneous detection of camphor in the formulation.

Fig. 6 (Plate - 6)

Figure 6: Methanolic extracts of samples showed a spot at Rf. 0.70 that matches with the spot of camphor in Track - 1.

RESULTS AND DISCUSSION

As already described under materials and methods, for standardization purpose in house (laboratory) sample of Dashan Sanskar Churna was prepared and procured and used as a standard sample and two market samples viz. MS-I and MS-II were procured from market for comparison purpose. All the samples were analyzed by using various parameters such as naked eye, pharmacognostical, physico-chemical and other instrumental methods. The data evolved from all the standardization parameters are revealed and discussed under this section.

A. Organoleptic Character

The organoleptic characters of the laboratory sample and market samples were analyzed and presented in Table 2.

The basic difference lies in the colour of sample, as in laboratory sample Supari, bhasma has been added in equal quantity to other ingredients while on commercial scale, first Supari is taken equal to other ingredients and then it is reduced to Bhasma. This may be the reason behind variation in color between standard and market samples. Astringent taste and odour is perceived because 6 ingredients of the formulation are aromatic in nature, camphor (*Cinnamomum camphora*) is mainly responsible for aromatic taste and odour. The half part of the formulation is Khatika (50%) and when reduced to powder form it becomes even smoother, but a little grittiness is felt after touching the formulation.^{8,9}

B. Micro-Chemical Tests

1. When samples of Churna were treated with iodine solution presence of blue colour indicated the presence of starch.
2. Volatile oil of the formulation when treated with 10% aqueous phenyl hydrazine hydrochloride solution, rod shaped crystals were observed.
3. Samples when treated with 5% alcoholic ferric chloride solution, blue colour was observed indicating the presence of Tannins.
4. Powder of Churna when treated with dilute hydrochloric acid soluble crystals of calcium oxalate were found.
5. Powder of Churna when treated with phloroglucinol and HCL (1:1) gave pink colour indicating the presence of vascular bundles / lignified sclerenchyma. / Pericyclicfibres / stone cells.
6. Solution of formulation when treated with ammonium oxalate solution, yield a white, precipitate which is soluble in hydrochloric acid and insoluble in acetic acid.

Test number 2 when applied to volatile oil of MS-II desired characteristics were not observed indicating the inferior quality of raw material used.^{8,9}

C. Physico-Chemical Parameters

Comparative physico-chemical values of in-house, MS-I and MS-II samples of Dashan Sanskar Churna are shown in Table 3.

Analysis of the data presented in above table reveals that in the laboratory sample and the two market samples more than 95% of the sample pass through 60 mesh and 85% pass through 85 mesh. Except MS-II both the samples pass about 90% through 85 meshes. Loss on drying of all the samples ranges from 7-9% which reflects about the controlled level of moisture in the sample. Total ash shows a significant values and ranges from 51-55% as half part of the formulation is khatika. And due to some reason acid insoluble ash is also found to be 6-7% which tells

about the silicacious matter. However, water soluble ash is considerably less almost about 1%.

Water soluble extractive is almost similar, except in MS-I which shows an increase in this value as compared to the other 2 samples. This may be due to quality of raw material used. Alcohol soluble extractive of all the sample ranges from 8-12% w/w. Volatile oil content of in house and MS-I shows similar results while in MS-II volatile oil content was found to be very less i.e. 0.4% v/w. In the formulation lavang and twak are the dominant source of volatile oil as compared to other aromatic ingredients. The low volatile oil content in MS-II may be due to either poor quality of lavang and twak or addition of less than required amount of both the ingredients in the formulation. Except MS-II colour of the volatile oil is transparent. It reveals the inferior quality of raw materials used.⁸⁻¹⁰

D. Qualitative Tests

All the 3 samples viz. in house and the 2 market samples were tested qualitatively for the presence of different phytoconstituents in the formulation. The obtained results of the qualitative tests are mentioned in Table 4.

E. Quantitative Estimation

1. Determination of calcium content

The half part of formulation contains khatikachurna and khatika is nothing but chalk containing chiefly calcium carbonate (The AFI). So, the Calcium content of all the samples was determined quantitatively. The data evolved from estimation is presented in Table 5. The half part of formulation contains Khatika so calcium content was determined. In all the three samples total calcium content was ranging from 41-45 % w/w.^{9,10}

2. Total tannin content

Total tannin content of all the samples was determined and tabulated in Table 6. Tannin is the main phytoconstituent in the formulations. The main source of tannin in the formulation is Kattha i.e. pale catechu and the other one is haritaki (*T. chebula*). In both the market samples the value of tannin is found to be considerably less as compared to in house sample. It clearly reflects the inferior quality of ingredients used in market samples.^{9,10}

F. High Performance Thin Layer Chromatographic Study

A variety of chromatograms were developed under different conditions using HPTLC technique Chromatograms are present in various figures.^{11, 12}

Figure 1 (Plate - 1) Represents the chromatogram of methanolic extract of samples developed by using mobile phase Toluene: Ethylacetate: Formic acid: Methanol (6:6:1.8:0.35), details of chromatogram are as follows:

- Track – 1 : Pale catechu (Kattha)
- Track – 2 : Catechin (reference standard)
- Track – 3 : Haritaki
- Track – 4 : Ellagic acid (reference standard)
- Track – 5 : Gallic acid (reference standard)
- Track – 6 : In house sample
- Track – 7 : MS-I
- Track – 8 : MS-II
- Track – 9 : Marich
- Track – 10: Piperine (reference standard)

The chromatogram obtained after viewing the plate at 254 nm has been presented in Figure. The details of the chromatograms under different conditions were recorded and tabulated in Table 7.

From the above explained chromatogram the presence of Kattha, Haritaki and Marich in the formulation can be easily detected. In track – 1 the zone at Rf. 0.45 is matching with standard catechin, in track 3 zone at Rf. 0.45 and 0.52 are matching with standards ellagic and gallic acid respectively. In track 9 Zone at Rf. 0.80 is matching with standard piperene. Combinely all these zones at nearly same Rf. can be seen in tracks 6, 7 and 8 i.e. of formulations. Under long U.V. (366 nm) also the same data was observed except in track 8 a red spot at Rf. 0.92 was seen additionally. The same data was recorded, after the plate was derivatized with anisaldehydesulphuric acid reagent.

Figure 2 (Plate - 2) shows the chromatogram developed to check out the presence of tannin constituents in the formulation, along with individual tannin containing ingredients and by using different reference standards. Details of the chromatogram are as follows Table 8.

Track – 1 : Kattha
Track – 2 : Catechin (reference standard)
Track – 3 : Haritaki
Track – 4 : Ellagic acid (reference standard)
Track – 5 : Gallic acid (reference standard)
Track – 6 : In house sample
Track – 7 : MS-I
Track – 8 : MS-II

Mobile phase – Toluene: Ethylacetate: Formic acid: Methanol (6:6:1.8:0.35).

After thoroughly going through above told Rf. values presence of Kattha and Haritaki can be easily detected in the formulation. In tracks 6, 7, and 8 Rf at 0.41, 0.45 and 0.51 indicates the presence of individual compound by the help of reference standards used. The same results were obtained after observing the plate under long U.V. (366 nm) and after derivatizing the plate with 5% methanolic ferric chloride solution.

Figure 3 (Plate - 3): This plate is specially designed to detect the presence of Marich in the formulation.

Reference standard piperine was used. Results obtained after observing the plate under 254 nm and recorded are presented here in Table 9.

Track – 1 : In house sample
Track – 2 : MS-I
Track – 3 : MS-II
Track – 4 : Piperine (reference standard)
Track – 5 : Marich

Mobile phase: Toluene: Ethylacetate: Formic acid: Methanol (6:6:1.8: 0.35).

From the Figure and Rf obtained detection of marich in all in all the samples in clearly indicated. Rf 0.79 in track 4 (piperine) is found to be matching in all the tracks. Same results were observed after examining the plate under long U. V. (366 nm). After derivatizing the plate with dragendorff's reagent some additional spots were observed and recorded which are presented and tabulated in Table 10.

Dragendorff's reagent is used to identify mainly alkaloidal constituents. So, after spraying the plate after Dragendorff's

reagent various spots (orange coloured) representing alkaloids including piperine can be easily observed.

Figure 4 (Plate - 4) Shows the chromatogram of Methanolic extract of samples along with detection of individual ingredients (i.e. lavang, shunthi, twak and musta) in the formulation. Rf Under different visualization conditions were recorded and tabulated here in Table 11.

Track – 1 : Lavang
Track – 2 : Eugenol (reference standard)
Track – 3 : Shunthi (hexane extract)
Track – 4 : Shagoal (reference standard)
Track – 5 : In house sample
Track – 6 : MS-I
Track – 7 : MS-II
Track – 8 : Twak (chloroform: hexane (1:1) extract)
Track – 9 : Musta

Mobile phase - Toluene: Ethyl acetate (9.3: 0.7)

Observations after derivatizing the plate with anisaldehyde sulphuric acid reagent are mentioned in the Table 12 and 13.

Under long and short U.V. no significant result was observed, but after derivatizing the plate with anisaldehydesulphuric acid reagent significant and comparative results were obtained.

In track 5, 6, 7 Rf at 0.53, mainly confirms the presence of lavanga in the samples, Rf at 0.35 and 0.24 confirms the presence of Shunthi in the sample. The detection was made even more easily because by using reference standards eugenol and shagoal. Standard Rf. of compounds was obtained which further worked as indicator. No matching Rf of twak in the sample was found. Rf. 0.12, 0.17, 0.29, 0.36 in tracks 5, 6, 7 represents and confirms the presence of musta in the samples.

Figure 5 (Plate - 5) shows the chromatogram of Volatile oils of the formulation along with simultaneous detection of individual drug volatile oil in the sample. Details of the chromatogram are:

Track – 1 : Volatile oil of lavanga
Track – 2 : Eugenol (Reference Standard)
Track – 3 : Volatile oil of Shunthi
Track – 4 : Shagoal
Track – 5 : Volatile oil of in-house sample
Track – 6 : Volatile oil of MS-I
Track – 7 : Volatile oil of MS-II
Track – 8 : Volatile oil of Twak
Track – 9 : Volatile oil of Marich
Track – 10: Volatile oil of Musta

Mobile phase: Toluene: Ethyl acetate (9.3: 0.7),

Rf Obtained after observing the plate under short U.V. (254 nm) are shows in Table 14; after the plate was derivatized with anisaldehydesulphuric acid reagent. The spots were clearer, and comparison was very easy. Rf were recorded and present here in Table 15.

Almost The presence of all volatile oil is detected in the formulation in track 5 And 6 spots at Rf 0.39 and 0.53 represents and confirms the presence of Shunthi and Lavanga respectively in the formulation by the help of reference standards used. Rf at 0.60 may be due to the presence of twak, 0.37 and 0.67 matches with the Rf obtained from chromatogram of marich. While Rf. 0.51 and 0.60 are found to be similar with Rf. obtained in chromatogram of Musta. In track 7 (MS-II) no spots were visible

either under short U.V. (254 nm) or after spraying the plate with anisaldehydesulphuric acid reagent this clearly reflects about the quality of ingredients used, either the quality is inferior, or the ingredients are added in a less proportion. In track 8 (Twak) also only one spot is visible under short U.V. (254 nm) with Rf 0.56 this also shows that the twak used in making the in-house sample was of sub-standard quality.

Figure 5 shows the chromatogram of methanolic extracts of sample, along with the simultaneous detection of camphor in the formulation. Details of the chromatograms are

Track – 1 : Camphor
Track – 2 : In - house sample
Track – 3 : MS-I
Track – 4 : MS-II

Mobile phase: Chloroform

Rf Recorded under short U.V. (254 nm) are given in Table 16.

From Figure 6 it can be observed that methanolic extracts of samples showed a spot at Rf. 0.70 that matches with the spot of camphor in Track - 1. This spot is however found to be almost absent in MS-II. (Very Faded Spot)

CONCLUSION

The current study is aimed to construct and set some standards. The market samples show colour variation which may be due to adding less amount of supari bhasma as compared to that mentioned in the classical formula. On qualitative tests the samples showed the presence of tannins, alkaloids, saponins, glycosides, triterpenoids and calcium. There was not much variation in the values of majority of physicochemical parameters of the laboratory as well as the market samples. Ash values of all the samples were found to be comparatively high. Colour and percentage of volatile oil was marginally low in the market sample II reflecting the quality of raw materials used.

Quantitative estimation of tannin was carried and the study revealed that total tannin in the laboratory prepared sample is 5.60% w/w where as the findings in market samples were almost half of it i.e. 3% w/w (MS-I) and 2.64% w/w (MS-II) This shows the comparative poor quality of haritaki and kattha used in market samples respectively. Whereas the Khatika being an important ingredient occupying half part (50%) of the formulation so, quantitative estimation of calcium was almost comparative, in laboratory sample as 45% w/w, in MS - I, 41% w/w and in MS - II sample II 43.3% w/w. An attempt to establish suitable HPTLC finger printing for Dashan Sanskar Churna has been made in order to identify the presence of different ingredients in it through HPTLC chromatograms and it is concluded in case of HPTLC fingerprinting of volatile oil of MS II no characteristic spots were observed, this may be due to the use of sub standard quality raw drugs. This finding is also supported by the microscopic examination and poor volatile oil yield of the same sample i.e. MS-II. Thus, by implementing organoleptic, pharmacognostic, physicochemical, chromatographic studies it is possible to identify the various ingredients in the formulation. The data

evolved from the present study will be very useful for routine quality control and assessment of Dashan Sanskar Churna and also to control the batch to batch variations.

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